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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/588,183	08/02/2006	Michael Mahler	3745	6721

7590 12/02/2009

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EXAMINER	
GALT, CASSI J	
ART UNIT	PAPER NUMBER
3662	
MAIL DATE	DELIVERY MODE
12/02/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/588,183	MAHLER ET AL.	
	Examiner	Art Unit	
	CASSI GALT	3662	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 August 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3 and 5-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3 and 5-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *10/26/2009*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 2, 5- 8, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arndt (US 6,501,414).

Regarding claim 1, Arndt teaches a method for determining the thickness of material by penetrating the material, in particular a method for measuring the thickness of walls, ceilings and floors (9:14-20, esp. 19-20), with which a measurement signal (14, Fig. 1) in the gigahertz frequency range (9:53-57) emitted using a high-frequency transmitter (32, Fig. 1) penetrates the material (16, Fig. 2) to be investigated at least once and is detected by a high-frequency receiver (44, Fig. 1), wherein the thickness of the material is measured via at least two transit-time measurements ("time delay" 10:47-53) of the measurement signal performed for various positions (10:1-42, esp. "plurality of positions" 10:2) of the high-frequency transmitter and the high-frequency receiver operated in a same device (12, Fig. 1).

Arndt teaches that the device may be moved by manual means (10:38-39), and that this may be particularly desirable in some locations (10:41-42), but does not explicitly teach that the device is hand-held. However, hand-held devices of the type taught by Arndt are known in the art; for example, Arndt describes one such prior art device at 3:38-48 (see especially 3:47-48). It would have been obvious to modify Arndt by implementing the device as a hand-held device in order to facilitate the manual movement taught by Arndt and because it could be done with no new or unexpected results.

Regarding claims 2 and 12, Arndt teaches that the transmitter and receiver are operated on a first surface (38, Fig. 1) of the material, and that the signal from the transmitter is reflected back to the receiver (9:35-38), which reflection necessarily implies a "reflector means". In the example of Fig. 1, object 18 acts as a reflector means.

Regarding claim 5, Arndt teaches that the measuring device is moved over a surface of the material to record the at least two transit-time measurements (10:1-42).

Regarding claim 6, Arndt teaches that the displacement path of the device is detected (10:11-13, 10:62-66).

Regarding claim 7, Arndt teaches that the measurement signal is generated in the gigahertz frequency range (9:53-57), but does not teach a pulsed-radar method. However, pulsed-radar methods are well known in ground penetrating applications of the type taught by Arndt. Further, Arndt teaches stepping the measurement signal over a plurality of frequencies (ab. 5-6), and it is known to implement such signals using pulses. It would have been obvious to modify Arndt by implementing the measurement signal using pulses because it could be done with no new or unexpected results.

Regarding claim 8, Arndt teaches that measurement frequencies fall in interval of 1500 MHz - 3500 MHz (9:56-57).

3. Claims 3, 9, 10, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arndt (US 6,501,414) in view of Nix (US 3,815,016) or Stump (US 5,904,210) or McEwan (US 6,492,933).

Regarding claims 3 and 9, the device taught by Arndt is clearly at least capable of being placed on a surface of a material. Arndt does not, however, teach a reflector means including a transponder, where the transponder is capable of being moved relative to the high-frequency measuring device. However, transponders of this sort are well known in the thickness measurement art. For example:

Nix teaches that "it is already known, for example in road construction, to arrange metal portions which will be subsequently called "reflectors" underneath the different

covering layers, and to measure the distance to the reflector by means of a high frequency gauge" (col. 1 lines 18-23).

Stump teaches a method for detecting the depth of an underground boring tool using a radar probe and radar detection techniques in which the boring tool is provided with a device which generates a specific signal in response to a probe signal (ab. lines 1-6). Fig. 1 shows how probing and detection unit 28 transmits a probe signal 36 into the ground towards underground boring tool 24, and col. 4 lines 41-43 refer to a cooperative target 20 coupled to underground boring tool 24, which cooperative target is shown in Fig. 16. Col. 4 lines 47-59 teach that the cooperative target allows reflections from the underground boring tool to be readily distinguished from returns from other reflection sources. The cooperative target moves relative to probing and detection unit 28 as the boring tool to which it is coupled advances.

McEwan teaches a system for thickness measurement wherein an active reflector is used to provide accurate measurements even in cluttered environments (ab. 3-5). McEwan's active reflectors may be translated or rotated, as described at 12:25-32 with reference to Fig. 10A.

The reflector means taught by Nix, Stump, and McEwan may be considered transponders, and each serves to provide distinct reflections in order to facilitate thickness measurement. It would have been obvious to further modify Arndt by providing such a transponder in order to provide distinct reflections to facilitate thickness measurement.

Regarding claim 10, Arndt teaches a position detection system for recording a path (60, Fig. 1, as per 10:62-66).

Regarding claim 11, the limitations of claim 11 do not differ from those of claims 3 and are rejected on the same grounds.

Response to Arguments

4. Applicant's arguments filed 8/10/2009 have been fully considered but they are not persuasive.

Regarding Applicant's argument that Arndt does not teach determining a thickness of material, but rather teaches detecting inhomogeneities within a material, Examiner respectfully disagrees. Although Examiner agrees that Arndt teaches detecting inhomogeneities, Examiner asserts that Arndt also teaches determining material thickness. See 9:14-21 (emphasis added):

> The present invention provides apparatus and methods for locating anomalies in microwave penetrable material, e.g., locating plastic mines or plastic (PVC) pipe in soil. Other concealed objects besides plastic mines can be located with the present invention. For example, an object encased in concrete may be detected. **Also, the thickness of a concrete floor can be determined** and, in some cases, the depth of a plastic pipeline and the diameter of the pipeline can be determined.

Further, Examiner asserts that by detecting the location of an anomaly such as a landmine, Arndt has effectively measured the thickness of the medium between the surface and the anomaly.

Regarding Applicant's argument that a determination of a thickness of the material from the measurement of the transmit time at two different locations is not disclosed by Arndt, Examiner respectfully disagrees. Arndt teaches performing measurements at a plurality of different locations at 10:1-42. For example, see 10:1-7 (emphasis added):

> Swept transmitter 32 steps or sweeps through all the frequencies **at each of a plurality of positions, such as position 34**. Antenna 15 may be physically moved as indicated by arrow 36 above surface 38 of microwave penetrable material or soil 16 and will sweep through each of the plurality of frequencies at each of a plurality of positions such as positions 34, 40, and 42, shown for example only.

Further, Arndt teaches the measurement of a plurality of transit times at each position at 10:43-53 (emphasis added):

> Swept receiver 44 receives a plurality of reflections due to the plurality of different frequency signals transmitted at each position. Swept receiver receives data from directional coupler 45 and provides this information to computer and software element 46. When received at block 48 and 50, the information including magnitude, phase, and **time delay for each reflection** may be measured and digitized at 48 and 50, stored for operation at 52, operated on by one of several preferred methods discussed subsequently at 54, and displayed or otherwise used or interpreted at 56 with or without a display.

Regarding Applicant's argument that Arndt does not teach penetration of a material, in which the measurement signal exits the material on a side opposite to the

transmitter and is then reflected again, Examiner respectfully disagrees. Arndt teaches penetration of the material at least in Fig. 1, where signals 20 and 22 have clearly penetrated medium 16. Further, as Examiner has argued above, Arndt teaches that the signal from the transmitter is reflected back to the receiver (9:35-38), which reflection implies a "reflector means". For example, in the example of Fig. 1, object 18 acts as a reflector means. In the case of measuring the thickness of concrete floor, the interface between the concrete and the adjacent material, whatever it may be, would act as a reflector means. Regarding the exit of the measurement signal from the material, this language is not present in the claims; however, such an exit appears to be inherent to the reflection process.

Regarding Applicant's argument that Arndt does not teach a hand-held device, Examiner has argued above that hand-held devices are well known in the art.

Regarding Applicant's argument that Arndt's object 18 cannot be considered a reflector means because it is enclosed in the medium or the layer and is not located on the second surface of the layer, Examiner respectfully disagrees, and asserts that object 18 may be considered to be located on a second surface of the medium - the surface between the medium and the object. In any case, Examiner has provided three references, Nix, Stump, and McEwan, which teach various reflector means known in the art. In particular, the reflector means taught by Nix is clearly located on a second surface of the material whose thickness is measured.

Regarding Applicant's argument that Arndt's measurement signal does not penetrate the material under investigation, since the object is located inside the layer, Examiner respectfully disagrees. Examiner asserts that once the signal has entered the material, the material has been penetrated.

Conclusion

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CASSI GALT whose telephone number is (571)270-1469. The examiner can normally be reached on Mon-Fri 7:30AM-5:00PM, Alt. Fri, Eastern Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas Tarcza can be reached on 571-272-6979. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/C. G./
Examiner, Art Unit 3662

/Thomas H. Tarcza/

Supervisory Patent Examiner, Art Unit 3662